We claim.

1. An improvement in a hydronic system including a heat exchanger when using a drag-reducing surfactant solution as a thermal distribution fluid comprising:

a surfactant solution flowing through said heat exchanger, which surfactant reduces fluid drag within said hydronic system, but not necessarily within said heat exchanger, said surfactant solution characterized by an optimized recovery time as defined by ability of said surfactant solution to rebuild molecular or micellar structures after disruption of said molecular or micellar structures; and

a fluid degradation device to create temporary fluid degradation in said heat exchanger to break or disrupt said molecular or micellar structures in said surfactant solution by high local shear stresses so that heat transfer rate of said surfactant solution is increased in the heat exchanger for a predetermined distance or time downstream from said degradation device, during which recovery time said molecular or micellar structures are being rebuilt, subsequent to which full drag and heat transfer reductions are again achieved,

whereby heat exchanger efficiency is recovered to an original level obtained without surfactant to achieve overall energy savings in said hydronic system.

2. An improvement in a method of heat exchange in a hydronic system comprising:

providing a surfactant solution as a heat exchanging fluid in a heat exchanger included within said hydronic system, which surfactant solution reduces fluid drag within said hydronic system, said surfactant solution characterized by a predetermined recovery time as defined by ability of said surfactant solution to rebuild molecular or micellar structures after disruption of said molecular or micellar structures; and disturbing flow in said heat exchanger to break or disrupt said molecular or micellar structures in said surfactant solution by high local shear stresses so that heat transfer rate of said surfactant solution is returned to a level approximating heat transfer rate of said heat exchanging fluid without said surfactant added for a predetermined distance downstream from said disturbance during said recovery time during which said molecular or micellar structures are being rebuilt.

3. A method of heat transfer recovery in turbulent flow of drag reducing surfactant solutions comprising

providing a degrading device which degrades the fluid with minimum pressure drop;

creating temporary degradation of a circulating fluid; and

conditioning of the drag reducing fluid properties relevant for degradation and recovery.

4. A fluid having optimized properties of degradation and recovery comprising:

a thermal transport fluid; and

a surfactant additive capable of withstanding stress in all pipes and fittings of a circulation system and providing asymptotic drag reduction in straight pipes, and some drag reduction in fittings, whereas in a heat exchanger in which said fluid is degraded by a degrading device, the drag and heat transfer reductions are temporarily substantially eliminated, said fluid remaining substantially degraded during its residence in said heat exchanger after which recovery occurs quickly after said fluid exits from heat exchanger.

5. The fluid of claim 4 where said fluid and surfactant in combination are characterized by a drag reduction recovery having a long dead time at substantially reduced drag reduction and a fast recovery to a substantially undegraded drag reduction level.

6. A fluid having optimized properties of degradation and recovery comprising:

a thermal transport fluid; and

a surfactant additive having, when added to said thermal transport fluid, a substantial independence of drag-reducing ability, degradation, and recovery properties as a function of temperature.

7. The fluid of claim 6 wherein said surfactant additive comprises a mixture of surfactants with opposing effects of temperature on drag-reducing ability, degradation, and recovery time.

8. The fluid of claim 7 where said mixture of surfactants comprises a cationic surfactant and a nonionic surfactant in which opposing effects of said cationic surfactant and nonionic surfactant substantially cancel each other to provide a substantially temperature independent surfactant additive.

9. A heat exchanger comprising:

a first heat exchanging fluid path;

a second heat exchanging fluid path, wherein at least one of said first and second heat exchanging fluid paths further comprises a dedicated degrading device disposed therein; and

a heat exchanging fluid with a temporarily degradable drag reducing surfactant additive disposed in said corresponding heat exchanging fluid path.

10. The heat exchanger of claim 9 wherein said dedicated device is used exclusively for degrading a heat exchanging fluid flowing through said heat exchanger.

11. The heat exchanger of claim 9 wherein said dedicated degrading device imposes a flow disturbance or shear stress uniformly across a cross section of said corresponding heat exchanging fluid path in which said dedicated degrading device is disposed.

12. The heat exchanger of claim 11 wherein said dedicated degrading device exposes every surfactant particle flowing in said corresponding heat exchanging fluid path to at least a supercritical stress.

13. The heat exchanger of claim 12 wherein said stress imposed by said dedicated degrading device is not significantly higher than said supercritical stress so that the flow energy needed for degradation is minimized.

14. The heat exchanger of claim 9 wherein said dedicated degrading device is disposed at or near an inlet to said corresponding heat exchanging fluid path.

15. The heat exchanger of claim 9 wherein said dedicated degrading device comprises a wire mesh disposed across said corresponding heat exchanging fluid path.

16. The heat exchanger of claim 15 wherein said wire mesh also functions as a filter.

17. A heat exchanger comprising:

a first heat exchanging fluid path;

a second heat exchanging fluid path, wherein at least a corresponding one of said first and second heat exchanging fluid paths further comprises a conventional hydraulic component normally found in a circulation system, which hydraulic component is disposed upstream and in proximity to said corresponding heat exchanging fluid path; and

a heat exchanging fluid with a temporarily degradable drag reducing surfactant additive disposed in said corresponding heat exchanging fluid path.

18. A method of heat transfer recovery in turbulent flow in a heat exchanger by means of a drag reducing surfactant fluid characterized by degradation and recovery of drag reducing fluid properties comprising:

conditioning said drag reducing fluid properties of said drag reducing surfactant fluid;

providing a degrading device which degrades the fluid with minimum pressure drop;

creating an initial temporary degradation of a circulating fluid in a flow of said fluid in said heat exchanger; and

after said fluid is initially degraded, creating additional disturbances in said flow to prevent recovery of the fluid.

19. The method of claim 18 where a smaller pressure drop than the one used for said initial degradation upstream of heat exchanger is used to create said smaller disturbance.

20. The method of claim 19 where conditioning said drag reducing fluid properties of said drag reducing surfactant fluid with a faster recovery to achieve asymptotic drag reduction immediately downstream from said heat exchanger.

21. The method of claim 19 where conditioning said drag reducing fluid properties of said drag reducing surfactant fluid by pipe stress to use shear

stress generated by said heat exchanging fluid paths of said heat exchanger to degrade said fluid.

22. The method of claim 9 where conditioning said drag reducing fluid properties of said drag reducing surfactant fluid by pipe stress to use shear stress generated by said heat exchanging fluid paths of said heat exchanger to prevent said fluid degraded by said degrading device from recovering.

23. The improvement of claim 2 further comprising maintaining flow rate of said heat exchanging fluid in said hydronic system, while flow rate of said heat exchanging fluid in said heat exchanger is increased in the heat exchanger through the addition of a secondary pump located in parallel with the heat exchanger and connected to the inlet and outlet of the heat exchanger.

24. A fluid comprising:

a base component; and

a surfactant having drag-reducing, fluid degradation, and fluid recovery properties which are substantially independent of temperature when combined with said base component.

25. A method of characterizing degradability of a fluid and degradation work imposed on a fluid comprising:

providing a flow of said fluid;

providing a degrading device in said flow to degrade said drag reducing properties of said fluid;

creating a pressure drop across said degrading device; and

measuring said pressure drop as an indicator of resistance to degradation of said drag reducing properties in said fluid, as well as an indicator of the degradation work imposed on the fluid.

26. A method of managing degradability of a fluid and degradation work imposed on a fluid comprising:

providing a flow of said fluid;

providing a degrading device in said flow to degrade said drag reducing properties of said fluid;

creating a pressure drop across said degrading device; and

providing a predetermined amount of time after degradation of said drag reducing properties of said fluid to allow recovery of said fluid without additional degradation work being performed, said predetermined amount of time being independent of velocity of said fluid.

27. A method of increasing heat transfer in a hydronic system having a heat exchanger over nominal design limits, said heat exchanger having a heat transport fluid therein which is characterized by a heat transfer rate, comprising:

adding a surfactant to said heat transport fluid to reduce drag in said hydronic system;

providing a flow of said heat transport fluid and said surfactant through said heat exchanger at an increased rate over said nominal design limits; and

providing a degrading device in said flow in said heat exchanger to degrade said drag reducing properties of said surfactant in order to increase said heat transfer rate of said heat transport fluid in said heat exchanger.